

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listings of Claims:

1-36. (canceled)

37. (currently amended) A The trench-gated MOSFET of Claim 88 formed in a semiconductor substrate of a first conductivity type, the substrate not comprising an epitaxial layer, the trench-gated MOSFET comprising:

at least four trenches formed at a surface of the substrate, a first trench being separated from a second trench by a first drain mesa, the second trench being separated from a third trench by a source mesa, and the third trench being separated from a fourth trench by a second drain mesa;

the source mesa comprising:

a source region of a second conductivity type opposite to the first conductivity type adjacent a surface of the substrate, the source region having a first doping concentration of the second conductivity type;

a body region of the first conductivity type adjacent the source region and extending across the second mesa, the body region having a junction depth deeper than the source region; and

a high voltage drift region adjacent the body region and extending across the second mesa, the high voltage drift region having a second doping concentration of the second conductivity type;

each of the drain mesas comprising:

a drain region of the second conductivity adjacent a surface of the substrate and extending entirely across the first and third mesas, respectively, the drain region having a third doping concentration of the second conductivity type; and

a low voltage well of the second conductivity type adjacent the drain region and extending entirely across the drain mesas, respectively, the low

voltage well having a fourth doping concentration of the second conductivity type; and

a high voltage well of the second conductivity type, the high voltage well deep-drain-layer abutting the low voltage well in each of the drain mesas and the high voltage drift region, the high voltage well extending below a bottom of each of at least the first, second, and third and fourth trenches;

wherein the first doping concentration is greater than the second doping concentration and the third doping concentration is greater than the fourth doping concentration.

38. (previously presented) The trench-gated MOSFET of Claim 37 wherein each of the drain mesas comprises a high voltage drift region.

39. (currently amended) The trench-gated MOSFET of Claim 37 comprising a deep ~~second~~ layer of the second conductivity type located beneath the high voltage well ~~drain layer~~, the deep ~~second~~ layer having a fifth doping concentration of the second conductivity type.

40. (previously presented) The trench-gated MOSFET of Claim 39 wherein the fifth doping concentration is greater than the fourth doping concentration.

41. (currently amended) The trench-gated MOSFET of Claim 37 wherein viewed from above the MOSFET comprises a two-dimensional ~~an~~ array of cells, each of the cells containing a source mesa or a drain mesa, the mesas being separated by intervening trenches.

42. (previously presented) The trench-gated MOSFET of Claim 41 wherein viewed from above the cells are polygonal.

43. (previously presented) The trench-gated MOSFET of Claim 41 wherein viewed from above the cells are rectangular.

44. (previously presented) The trench-gated MOSFET of Claim 41 wherein viewed from above the cells are square.

45. (previously presented) The trench-gated MOSFET of Claim 41 wherein viewed from above the cells are longitudinal stripes.

46. (previously presented) The trench-gated MOSFET of Claim 41 comprising electrical contacts to respective body regions in the cells, the electrical contacts occurring in a regular and repeated spacing.

47. (currently amended) The trench-gated MOSFET of Claim 37 ~~37~~ wherein the body region has a non-Gaussian doping profile in a vertical cross-section.

48. (previously presented) The trench-gated MOSFET of Claim 37 wherein the body region comprises a series of implants formed at differing energies.

49. (previously presented) The trench-gated MOSFET of Claim 37 wherein the body region has a peak doping concentration higher a doping concentration of first conductivity material at the surface of the substrate.

50. (previously presented) The trench-gated MOSFET of Claim 37 wherein the gate comprises two polysilicon layers, formed from different depositions, each of the polysilicon layers being doped with material of the same conductivity type.

51. (previously presented) The trench-gated MOSFET of Claim 37 wherein the at least four trenches are separate from each other.

52. (previously presented) The trench-gated MOSFET of Claim 37 wherein the at least four trenches are part of an array of interconnected trenches.

53. (currently amended) The trench-gated MOSFET of Claim 37 wherein the source ~~second~~ mesa comprises a body contact region of the first conductivity type formed in an opening in the source region to facilitate contact to the body region, the body contact region having a sixth doping concentration, a doping concentration of the body contact region at the surface of the substrate being higher than a doping concentration of the body region.

54.-88. (canceled)

89. (currently amended) The trench-gated MOSFET of Claim 37 ~~88~~ wherein the trenches form an orthogonal grid that separates the source and drain mesas.

90.-94. (canceled)

95.(currently amended) The trench-gated MOSFET of Claim 39 ~~88~~ wherein the deep ~~drain~~ layer is formed by ion implantation.

96.(currently amended) The trench-gated MOSFET of Claim 39 ~~88~~ wherein the deep ~~drain~~ layer has a peak doping concentration at a level deeper than a level of a bottom of the trenches.

97.(currently amended) The trench-gated MOSFET of Claim 39 ~~88~~ wherein the deep ~~drain~~ layer has a peak doping concentration higher than a doping concentration of second conductivity type at the surface of the substrate.

98.(currently amended) The trench-gated MOSFET of Claim 37 ~~88~~ wherein ~~the column of dopant of the second conductivity type in each drain mesa~~ comprises multiple implants performed at differing energies.

99.(currently amended) The trench-gated MOSFET of Claim 37 ~~88~~ wherein the high voltage drift region ~~lower layer in each of the source mesas~~ is formed by a high energy ion implantation.

100.(currently amended) The trench-gated MOSFET of Claim 37 ~~88~~ wherein ~~the three-layer sandwich in each source mesa~~ comprises ~~is formed by~~ multiple implants performed at differing energies.

101.(currently amended) The trench-gated MOSFET of Claim 37 ~~88~~ wherein the body region ~~middle layer of the three-layer sandwich~~ in each source mesa is formed by multiple implants performed at differing energies.

102-103. (canceled)